

Water Planning Information Exchange

Greg Smith
May 20, 2011

Sound decisions require good information. Too often, we do not know if the necessary data is collected; if it is we often do not know who has collected the data. When discussing strategic planning within the Department of Water Resources, the lack of knowledge of which programs collect what data is often voiced as a concern. On a larger scale, lack of access to water resource information constrains our ability to craft innovative solutions to regional issues and integrate these projects into a statewide water management framework. Water Planning Information Exchange's (Water PIE) purpose is to change this and to make planning decisions easier and more defensible.

Data collection, management and publication present many complicated considerations for a single organization, including:

Importance. Decision makers increasingly rely on data to integrate concepts and make complex decisions. Organizations need to evaluate the data collected, and the networks, in light of the current generation of policy questions.

Consistency. An organization is likely to have multiple copies of data, without any single, authoritative data set. Edits made to one copy never make it back to other copies of the data. Over time, data sets diverge, and organizations must use resources to maintain multiple data sets.

Currency. If an organization has multiple copies of data, most likely at least one will be out of date because not all edits make it back into all copies of the data.

Quality. An organization without standards does not know the quality of its data, and cannot assess the applicability of the data to a specific issue.

Efficiency. Organizations expend resources to find, check and correct data unnecessarily. Organizations may also pay to acquire duplicate data.

Continuity. The historical records of an organization represent significant investments by an organization. Ceasing data collection because of limited foresight, especially for time-series data, means forfeiting that investment.

Return on Investment. Data collection, management and publication activities can easily die a death by a thousand cuts, because there are not immediate rewards or beneficiaries.

Every organization struggles with these considerations and addresses these issues in its own way. These issues are compounded when working across organizations. Organizations have overlapping, and sometimes, conflicting mandates that multiply the chances for duplication of efforts, redundant costs, different data formats and inconsistencies. These struggles with data consideration should not prevent collaboration between organizations.

The California Water Plan Advisory Committee recognized the importance of, and the difficulties organizations have, with data. In the 2005 Update, the California Water Plan

made fourteen recommendations. Recommendation 11 - Improve Water Data Management and Scientific Understanding, states:

“DWR and other State agencies must improve data, analytical tools, and information management and exchange needed to prepare, evaluate, and implement regional integrated resource plans and programs in cooperation with other federal, tribal, local, and research entities.”

California Water Plan, Update 2005. Volume 1. Chapter 5. Page 5-17.

In Update 2009, the California Water Plan recommended developing Water Planning Information Exchange. (California Water Plan, Update 2009. Volume 1. Chapter 6. Page 6-15.)

Water Planning Information Exchange is a federated system for water resource information, intended to change the status quo. A federated system is like a water wheel. At the end of each spoke, is an autonomous data set. At the hub is a system that links the spokes together. There are many examples of successful federated systems, such as IWRIS (<http://water.ca.gov/iwris/>) and CalAtlas (<http://atlas.ca.gov/>).

The spoke is a data set from an organization. The amount and type of information an organization chooses to share is voluntary. And, an organization does not have to change any of its procedures or standards to participate in Water Planning Information Exchange.

The hub is a portal to water resources information. Water Planning Information Exchange will use a web-based, geographic user interface for the portal. Access to water resources information will be easy. A person interested in water resources information would be able to select an area of California, select an organization, select some type of data of interest, or some combination. Water Planning Information Exchange would query the spokes, and return the information to the user in a standard format.

The hub does not store water resource information, other than what is necessary to define the spoke. Any information returned by a query is the current information that spokes are providing at that moment.

When an organization wants to share information via Water Planning Information Exchange it would have to register as a spoke on the wheel. When registering, an organization would have to specify:

What is the spatial information the organization shares? A point, such as a data collection site; a line, such as a river, a sampling transect or a dam; or an area, such as a service area or political boundary?

What is the information the organization share for each spatial entity?

What is the metadata for the information, including:

Name of the data set

Name of the organization
Contact information
Date(s) when the organization collected the data
Access restrictions, if any, and
An explanation of any codes used in the data.
How can Water Planning Information Exchange retrieve information from the organization? In technical terms, what web service should Water Planning Information Exchange call?

This registration information, or common language, each spoke provides to the Water Planning Information Exchange is the “glue” to federate the disparate data sets. .

People will have access to the data shared via all the spokes on Water Planning Information Exchange. A person will easily be able to understand what information different organizations collect and where the information is collected using Water Planning Information Exchange. The information from different organizations can be leveraged to address questions that a single organization alone could not answer.

The goal is to use Water Planning Information Exchange to share any information that would inform the California Water Plan. The subject material can range from basic hydrologic information, such as surface water, groundwater, water quality and climate information; to information about water use, demographics, water rates, service areas, environmental mitigation, and water projects. Organizations could share all of this water resource information and more through Water Planning Information Exchange.

The potential for sharing information on Water Planning Information Exchange is enormous. In California, there are 481 incorporated cities, 58 counties, about 500 urban water utilities that prepare urban water management plans and about 125 agricultural water utilities. Each of these could share information that would improve the California Water Plan, as well as regional water management solutions. In addition, State and federal agencies collect and publish water resources information. This information could be shared through Water Planning Information Exchange, as well as available on individual program web pages. Finally, there is information from non-profit organizations and schools. Water Planning Information Exchange would provide a method for these organizations to share information that they would not otherwise have. All of these organizations could be spokes on the Water Planning Information Exchange wheel.

The Department of Water Resources plans to start developing Water Planning Information Exchange in the fall of 2011, and have a publically available product in late 2013. The Department will use IWRIS as a prototype for Water Planning Information Exchange. Data from IWRIS and Water Data Library will be the first spokes on the wheel. The Department will solicit volunteers for additional spokes in late 2012. Given the potential, the information shared via Water Planning Information Exchange will grow over time.

Federated systems have worked as collaborative solutions to complex and difficult issues. These systems work in heterogeneous environments, and allow organizations to retain ownership of their information. Federated systems are a great way to share information with a minimum of standards. With Water Planning Information Exchange, the California water community can decide how to answer some essential questions, including:

How can we increase the accessibility of water resources information?

What water resources information do we need for better planning?

Where is water resources information lacking?

How can we improve the quality of water resources information?

How can we reduce duplication of effort among organizations?

